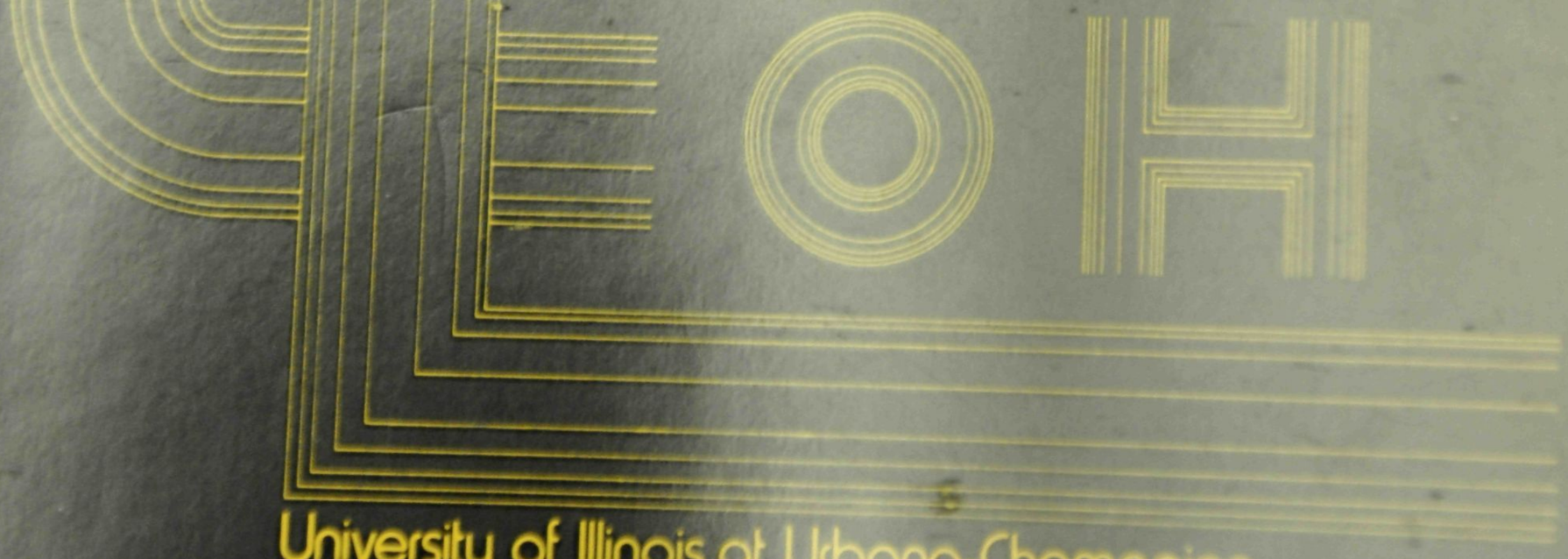
engineering open house

march 3 & 4, 1978

ENGINEERING:
THE SPEARHEAD OF PROGRESS



University of Illinois at Urbana-Champaign

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Engineering:

the spearhead of progress

1978 engineering open house uiuc university of illinois

Special thanks to Marilyn Johnson for EOH graphics, and to Gerald Barrett for the cartoons.

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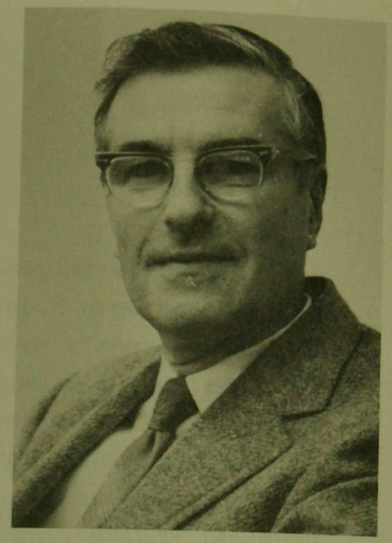


Welcome
to the College of Engineering

Our students chose the intriguing anachronistic slogan "Engineering: Spearhead of Progress" to express the traditional and continuing commitment of engineers to the use of their talents for the benefit of mankind. They suggest that we look backward in time and extrapolate to the future. As students now and as engineers later they look forward to taking part in the ever-accelerating advance of knowledge and the ever more complex engineering application of knowledge. They expect to find socially acceptable technological means of ameliorating the myriad of societal problems that threaten to overwhelm us. Realism and historical perspective both justify and temper their optimism. They know that when they are at the peak of their productive years, the enormously difficult engineering problems we face today, that lie at the heart of so many of our societal difficulties, will pale in retrospect.

Great engineering achievements of the past and the expanded engineering capabilities of today give them pride and faith in the future. As you travel the halls and laboratories of the College we hope you will share this faith and sense of excitement. See for yourself some of the progress being made at one of the leading engineering schools of the world, sample some of the many forefront areas of research, and glimpse our dedication to teaching and public service.

Engineering Open House has become one of our annual highlights. We are proud to have this opportunity to show you what the College of Engineering at the University of Illinois at Urbana-Champaign means to the people of the state. The students and faculty have been working very hard for the past year to make your visit to the 1978 Engineering Open House both pleasant and rewarding.

D. C. Drucker, Dean

Engineering Open House History

This year's Engineering Open House is the result of many years of evolution. Beginning around the turn of the century, various departments began to sponsor shows at which students and faculty collaborated in demonstrations and lectures. Inspired by the success which these previous shows had enjoyed, the first all-engineering open house was held in the spring of 1920. Other open houses, called Illinois Student Engineering Exhibitions, were held in later years, but were discontinued during World War II. Beginning in 1948, the newly named Engineering Open House was held biannually. In 1950 Open House was made an annual affair. Today the Engineering Open House is a well-planned and successful annual event.

Since its beginning, Engineering Open House has never been executed merely as an exhibition or stunt show. There are, in fact, three major objectives which Open House seeks to realize. The first goal has always been to provide the students participating with a valuable part of their education which is learned not so much in the classroom as in meeting rooms and around conference tables. The second objective is to better acquaint the public with some of the fundamental principles upon which the science of engineering is built, as well as with the facilities and work of the college. The third aim is to further the progress of engineering by demonstrating new advances in technology.

Engineering Open House is more than an exhibition or show--it's a major annual event which involves thousands of hours of preparation by engineering students throughout the year. We hope you will learn from and enjoy the results of their efforts.

Welcome to EOH '78

Paula Traynor, EOH Chairperson

The purpose of the Engineering Open House is to inform visitors about engineering, specifically engineering here at UIUC. Viewing the buildings and hundreds of exhibits that are on display should impress upon the visitor the wide range of information that embodies engineering. This Open House will demonstrate that the profession of engineering is much more than being knowledgeable. It is also applying this knowledge to achieve an advancement in a certain field.

Basically, an engineer helps society through a technological background. He is presented with problems, some of which seem virtually unsolvable, and through in-depth analysis, he comes up with a possible solution. This answer must not only be scientifically sound, but also economically, environmentally, and socially sound. Through this process many significant advancements are made.

This year a special effort has been made by the students to set up exhibits that follow the theme "Engineering: Spearhead of Progress." Due to this endeavor, people attending Open House will see many of the advancements that have been made in every field of engineering.

Engineering Departmental Offices and Undergraduate Services

Curriculum	Location
Aeronautical and Astronautical Engineering	105 Transportation Bldg.
Agricultural Engineering	245 Agricultural Engineering Bldg.
Ceramic Engineering	204 Ceramics Bldg.
Civil Engineering	1105 Civil Engineering Bldg.
Electrical Engineering	156 Electrical Engineering Bldg.
Computer Engineering	156 Electrical Engineering Bldg.
Computer Science	252 Digital Computer Lab (DCL)
Engineering Mechanics (TAM)	212 Talbot Lab
General Engineering	209A Transportation Bldg.
Industrial Engineering	152 Mechanical Engineering Bldg.
Mechanical Engineering	152 Mechanical Engineering Bldg.
Metallurgy and Mining Engineering	201 Metallurgy and Mining Bldg.
Nuclear Engineering	223 Nuclear Engineering Lab
Physics	231 Physics

Aeronautical and Astronautical Engineering

The Department of Aeronautical and Astronautical Engineering prepares students for participation in the continuing space program and in the application of aerospace technologies to the improvement of life on earth. Basic to the AAE curriculum is the study of solid mechanics, propulsion, fluid mechanics, thermodynamics, structures, and control systems. The curriculum also allows the AAE student to choose from many elective studies in the humanities and social sciences, and in science and technology. Aerospace engineers are actively involved in the design of systems of transportation, communication, and space exploration; in earth resources monitoring and environmental protection; and in the development and demonstration of new, renewable energy sources.

Exhibits: (Aero Lab B and Woodshop)
- Wind Tunnels
- Orbital Mechanics
- Ramjet
- Aerodynamics
- Aerospace Structures
- Energy

Agricultural Engineering

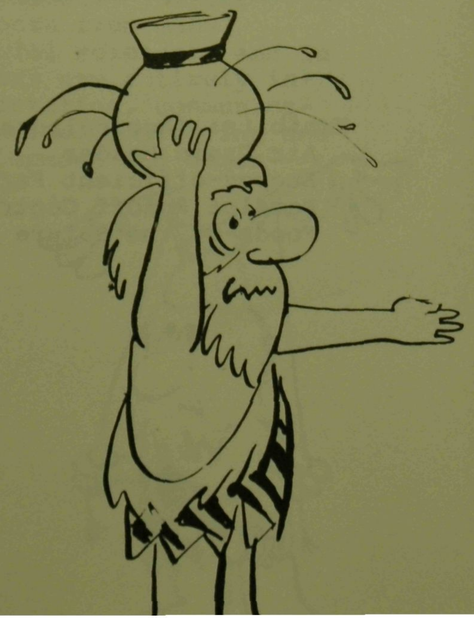
In order to provide the productivity to feed the over three billion inhabitants of earth, the agricultural industry requires a large amount of engineering technology. Agricultural engineering is the application of engineering principles to problems in agriculture. With the trend toward more complex machines and automation, there is a wide variety of choices of type and place of work open to the agricultural engineer. The profession has five major divisions: power and machinery, soil and water, electrical power and processing, structures and environment, and food engineering.

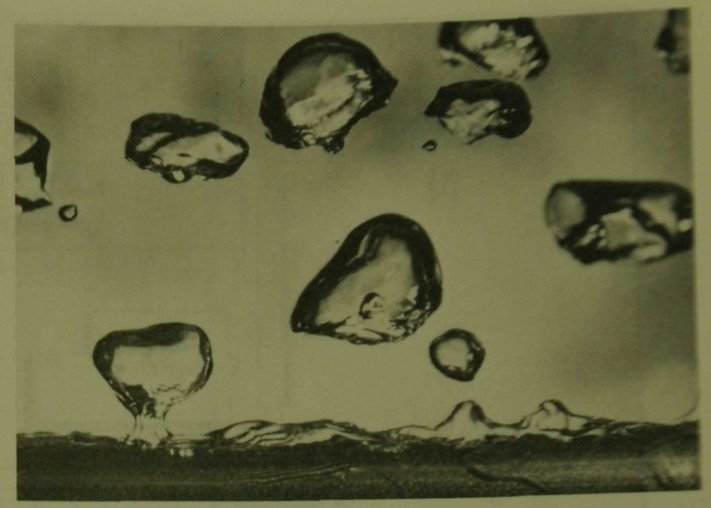
Exhibits: (Agricultural Engineering Bldg.)
- Air Grain Header
- Energy-efficient Farm
- Feedlot Runoff Control Studies
- Foods of the Future

Ceramic Engineering

Technology and science are dependent upon each other. One cannot move forward without the assistance of the other. When scientists wanted to see the structure of the atomic nucleus, they needed special tools to break up the nucleus. In the 1940s, one of the earliest of these tools, the betatron, was developed on the UIUC campus. Important aspects in building the betatron were which material to use and how to design an evacuated ring capable of holding the charged particles. Pictured here is one of the first of these rings, made of a highly vacuum-tight porcelain, as it comes out of the mold in which it was slip cast in the Department of Ceramic Engineering. Problems dealing with inorganic nonmetallic materials are the ceramic engineer's specialty. These materials must usually be processed at extremely high temperatures thereby making the ceramic engineer a high-temperature chemist who must find or design new materials to fit the needs of science and technology.

Exhibits: (Ceramics Bldg.)
- Porcelain Enamels
- Frit Pouring
- Glass
- Spark Plug Strength Demonstration



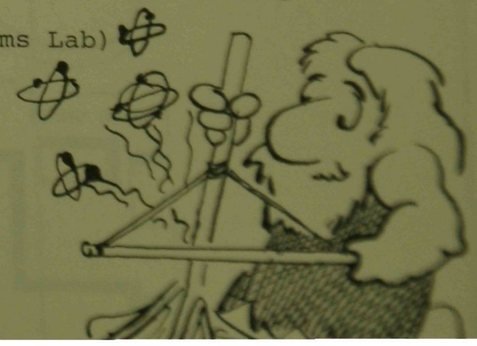


Chemical Engineering

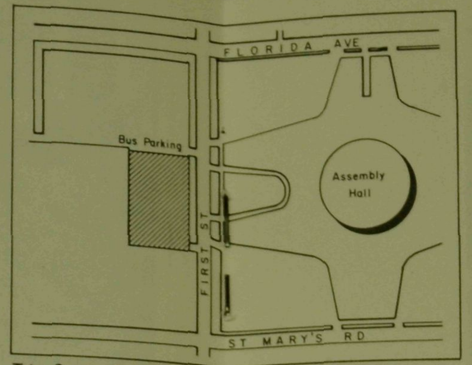
Traditionally the chemical engineer is associated with the oil and chemical industry. However, chemical engineering is adaptable to a wide variety of process industries which range from such extremes as nuclear fuel fabrication to food processing. This diversification creates a broad range of studies in thermodynamics; fluid dynamics; heat, mass, and momentum transport; chemical reactor design and kinetics; catalysis; unit operations; process control; mathematical modeling; optimization; and computer simulation.

The chemical engineering curriculum is designed to offer students a fundamental basis in the physical sciences with a strong emphasis on chemistry and engineering applications. This broad background allows one to be equally at ease entering positions in research, development, process engineering, project engineering, design, production, technical service, sales, and management.

Exhibits:
- Professor Haight's "Chemistry Magic Lecture" (100 Noyes Lab), Friday 4:00-5:00 p.m.
- Distillation Operations, Chem Pop, Other Unit Operation Processes (Roger Adams Lab)
- Process Control (201 Roger Adams Lab)

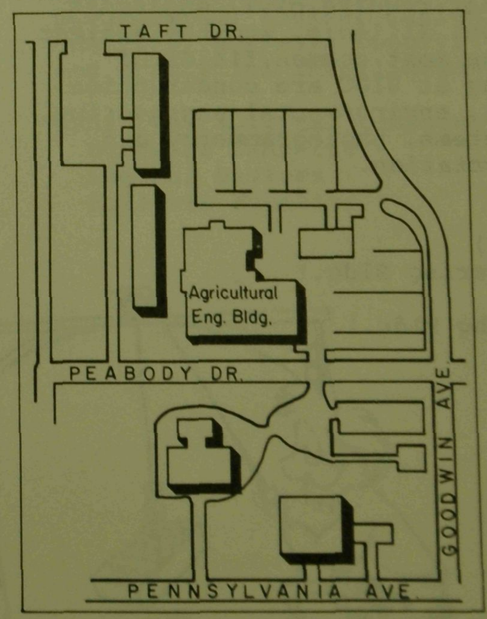


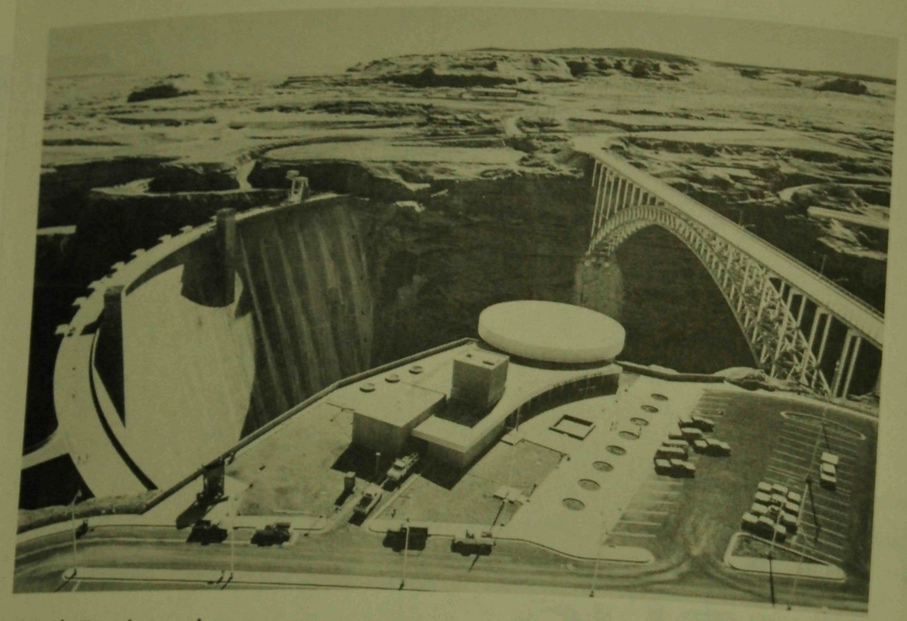
ENGINEERING CAMPUS



Take Green St. or Springfield (for example) west, turn left (south) on First and follow to bus parking lot.

Proceed south on Goodwin to reach this area.

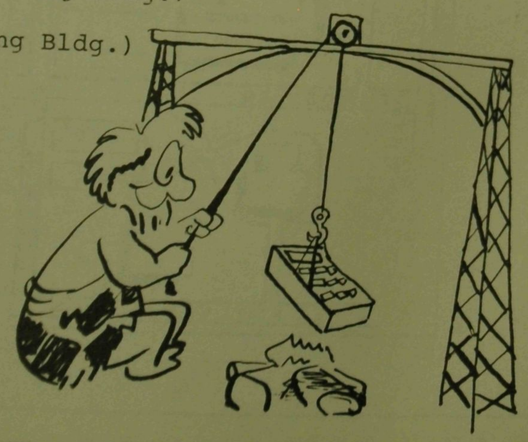


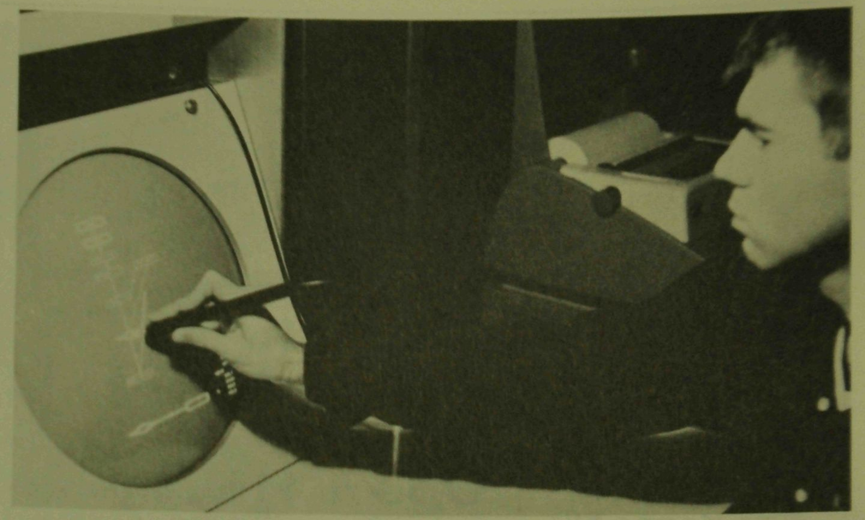


Civil Engineering

Civil engineers are primarily responsible for the planning, design, and construction of various structures. Students are provided with a foundation in the physical and engineering sciences that can be applied to the design and construction of buildings, bridges, dams, and nuclear installations, and to surveying, map making, and other engineering projects. Two local construction projects that require civil engineers are the Alton Lock and Dam in Alton, Illinois, and the nuclear facility at Clinton, Illinois. The most common fields of specialization in civil engineering at UIUC are construction materials, construction management, environmental engineering, geotechnical engineering, hydrosystems, photogrammetry and geodetics, structures, and transportation.

Exhibits:
- Transportation (Engineering Hall)
- Model Span Contest (Civil Engineering Bldg.)
- Photogrammetry (Woodshop)
- Concrete Canoes (Civil Engineering Bldg.)
- Materials Testing (Talbot Lab)
- Others (Civil Engineering Bldg.)

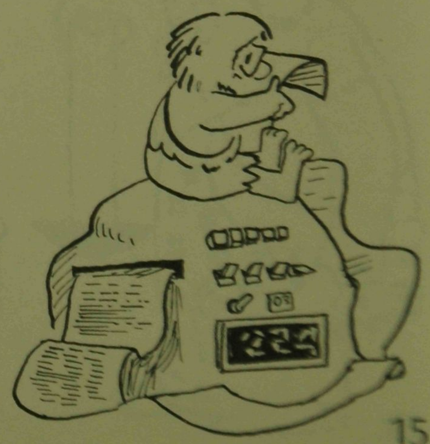


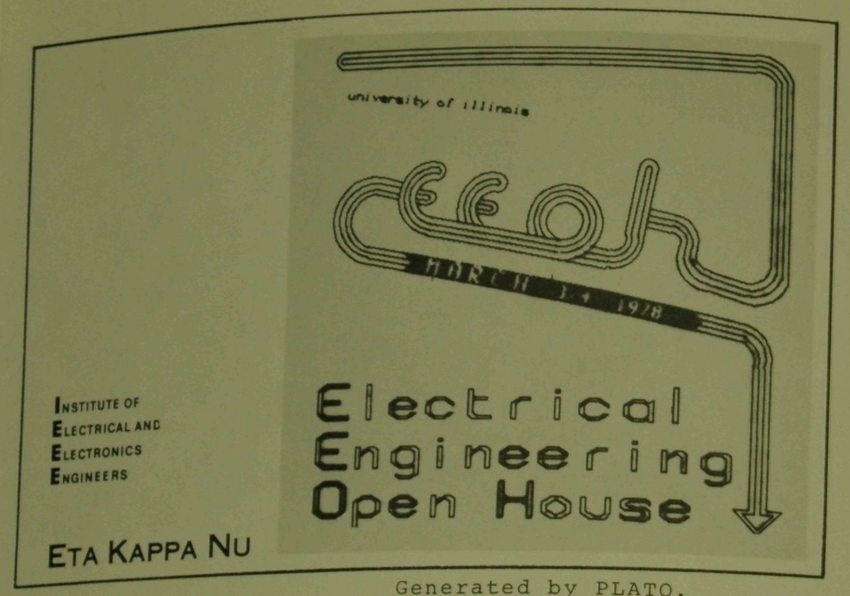


Computer Science

The field of computer science encompasses the design of the computer itself and the equipment used by it (the "hardware"), the programs which run on it (the "software"), the methods incorporated in such programs (numerical analysis), and the theory behind it all. Students take courses in each area in order to acquire a broad knowledge of the field. The department conducts research and teaches courses in such areas as programming, logical design, computer circuits, numerical analysis, automata theory, threshold logic, switching theory, and artificial intelligence.

Exhibits: (Digital Computer Laboratory)
- Hardware Exhibits
- Logical Devices
- Software Exhibits





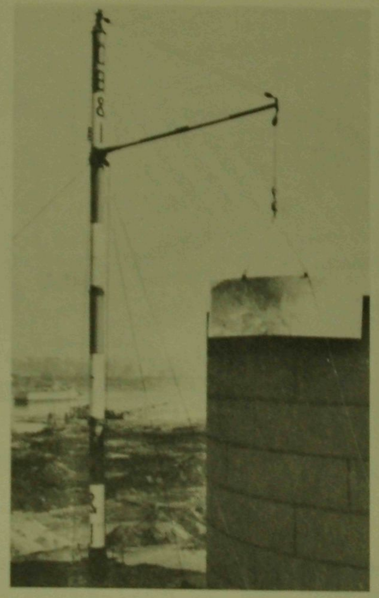
Generated by PLATO.

Electrical Engineering

Electrical engineering is the study of electrical phenomena and their practical application in real-world situations. The Department of Electrical Engineering prepares students for responsible engineering positions in research, development, design, operations, and administration.

Unlike many departments, more than half of the program of study is elective. Students specialize in their chosen area of interest. In fact, the aspiring electrical engineer has a wide range of interesting fields to choose from, including computer engineering, power generation/distribution, control systems, radar, electronics, biomedical engineering, and lasers, to name a few.

When you enter the Electrical Engineering Building, be sure to pick up a copy of the EEOH program. It will guide you to all of the exhibits and demonstrations that we have prepared for you.

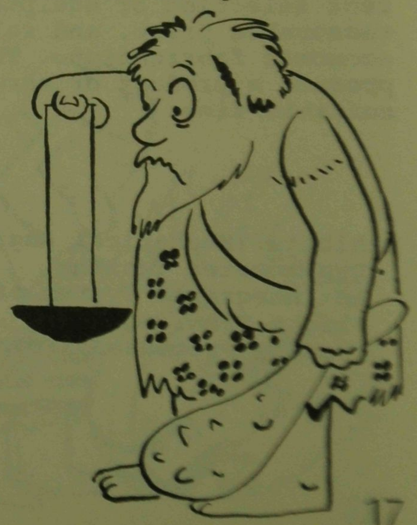


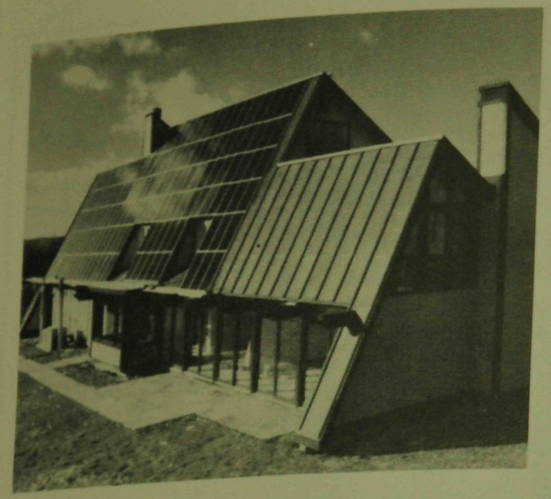
General Engineering

The education of the general engineer is more diversified than traditional engineering programs generally allow. General engineering is a comprehensive program in the basic sciences, the engineering sciences, a chosen scientific field of concentration, and project design methods.

The core of the curriculum is engineering design. The design courses cover the basic concepts and methodologies in structural design, machine design, and control systems. Following the emphasis on design, another special feature of the general engineering program is the opportunity to select a secondary field of concentration. Twenty-one hours of electives can be organized to gain a depth of understanding in a chosen related field.

Exhibits are located in the Transportation Building





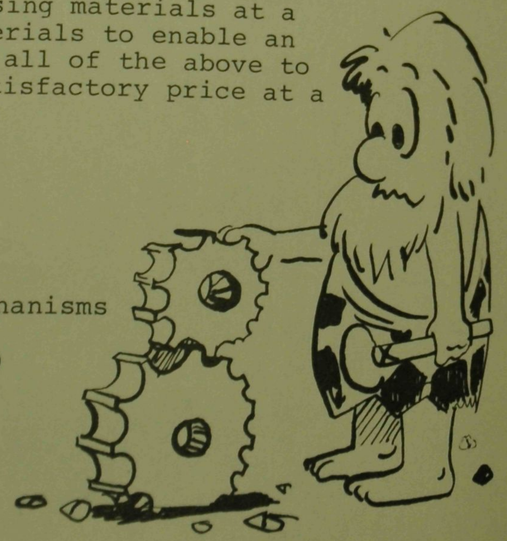
Mechanical and Industrial Engineering

The Department of Mechanical and Industrial Engineering provides a theoretical background for a career which employs knowledge of computer-controlled systems, metal and material characteristics, systems planning and optimization, machine design methods, heat transfer and thermodynamics, and basic economics.

Mechanical engineers are concerned with the use and economical conversion of energy to provide power, light, heat, cooling, and transportation. They design and produce machines to lighten the burden of human work, and they engage in the creative planning, development, and operation of systems for using energy, machines, and resources.

Industrial engineers are involved in determination of production sequences for economy of human resources, the correct selection of equipment for processing materials at a reasonable price, and selection of materials to enable an economic fabrication. They coordinate all of the above to produce a product or service with a satisfactory price at a suitable time.

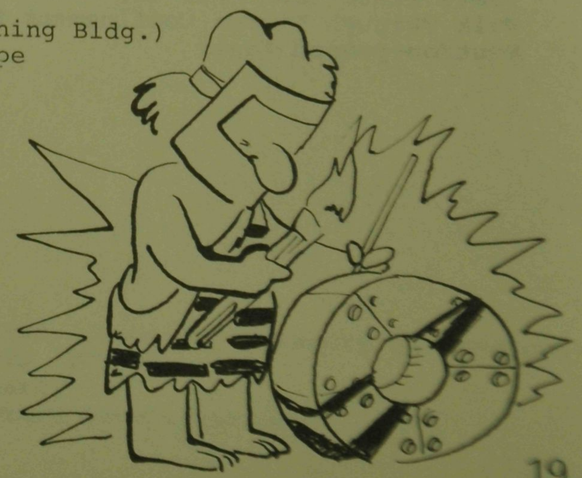
Exhibits:(Mechanical Engineering Bldg.)
- Dynamometer Testing
- An Integrated System of Ingenious Mechanisms
- Flight Simulator
- Foundry Processes (Foundry Laboratory)

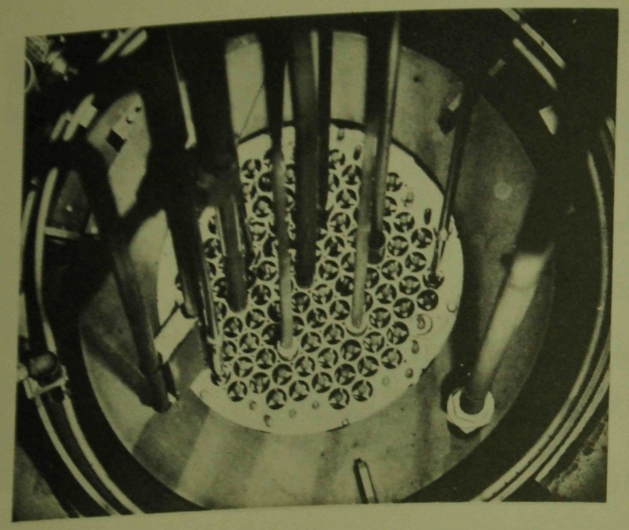


Metallurgical Engineering

The metallurgist plays an important role in the development and production of engineering designs. During the development of a product, the metallurgist is responsible for selecting a material or designing a new alloy which will meet the required specifications set forth by the designers. During production he sets the standards for quality control to insure against failure. Should failure occur the metallurgist plays a major role in the analysis of the failed part. To meet this challenging career a wide knowledge of mechanical and environmental behavior of materials is required. The mainstay of the metallurgical program at UIUC develops the relationships between macroscopic behavior of metals to the mechanisms which occur on the microscopic to atomic levels. To develop individual interests a wide variety of courses are also offered such as fracture mechanics, corrosion, alloy design, polymer science (plastics), electron microscopy, and welding. Classes within the department are small, with many opportunities for student-faculty contact. Student research is encouraged with faculty members readily available for consultation.

Exhibits: (Metallurgy and Mining Bldg.)
- Scanning Electron Microscope
- Nylon Rope Trick
- Spin Casting Wire
- Hydrogen Bomb

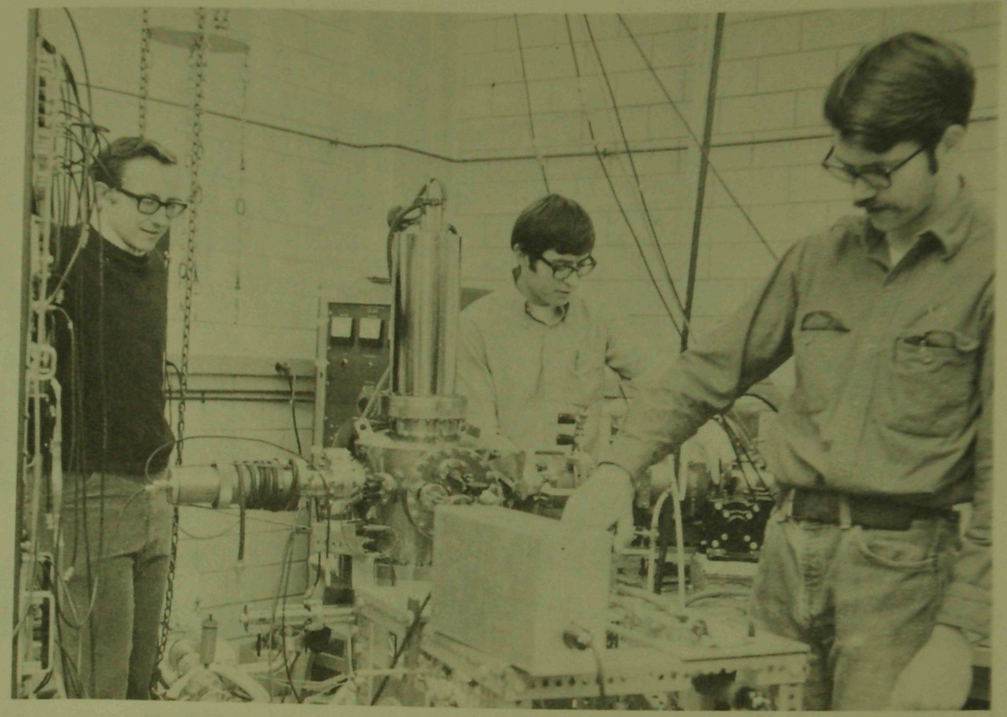




Nuclear Engineering

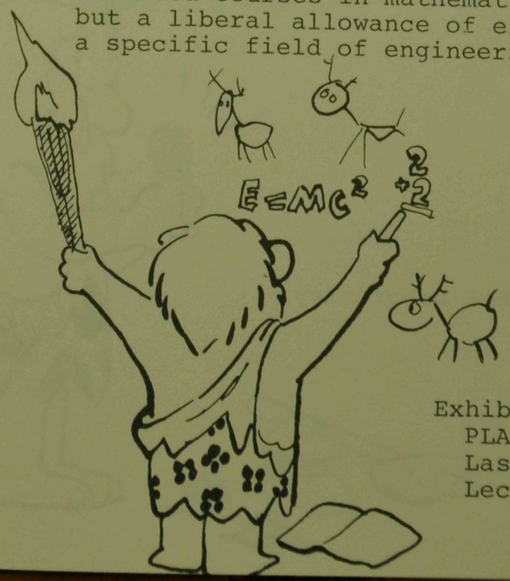
Satisfying society's energy needs is the primary concern for students in nuclear engineering. This subject and its related aspects offer students a wide range of topics to study. Energy sources considered extensively are those of fission and fusion. General topics currently researched are reactor physics and kinetics, radiation shielding and dosimetry, fission product yield, neutron activation analysis, and heat transfer and fluid mechanics in reactor systems. Research is also being conducted on the nuclear fuel cycle and waste management, direct energy conversion and controlled nuclear fusion which concerns plasma dynamics, injection heating and fueling, and a study of various plasma confinement devices.

Exhibits: (Nuclear Radiation Lab, NRL II)
Tours Through TRIGA (reactor core shown in photograph)
Theta Pinch (Can Crusher)
Walk Through Plasma Confinement Device
Neutron-pumped Laser

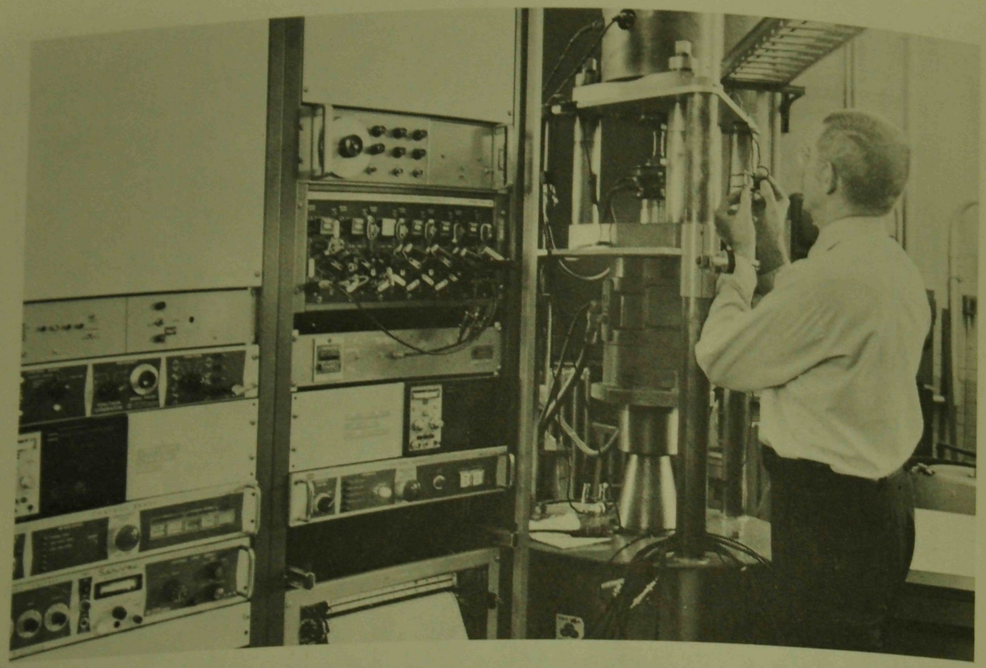


Physics

Physics is the study of energy, matter, and their relationship with one another. Although physics is one of the most abstract of the physical sciences, practical applications of it have led to such advances as nuclear energy, electronics, and rocket propulsion. Physicists may engage in fundamental research and in constructing mathematical theories, or they may delve into applied physics, in which they use acquired information to solve practical problems. In the physics curriculum, advanced courses in mathematics and physics are emphasized, but a liberal allowance of electives allows a student to study a specific field of engineering in which he may be interested.



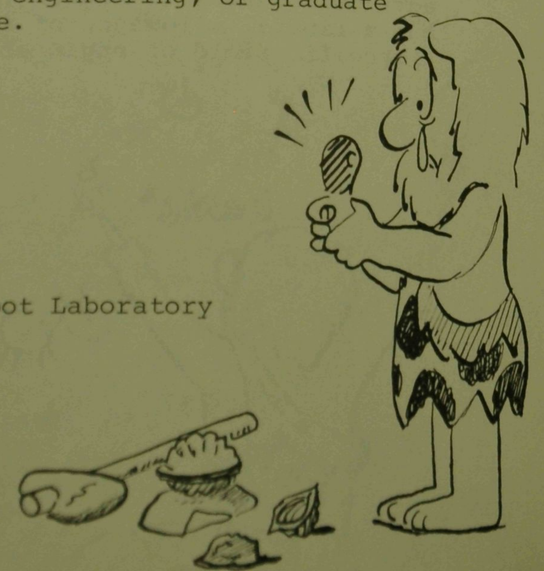
Exhibits: (Loomis Laboratory of Physics)
PLATO (VOTRAX)
Lasers
Lecture Demonstrations



Theoretical and Applied Mechanics

This curriculum attempts to rationally link all fields of engineering into a whole. The student is given education and experience in a wide variety of subjects. An emphasis is placed upon mechanics, or the behavior of all materials from fluids to metals.

A firm foundation of understanding is provided for contriving self-education. This allows the student to participate in research and development in modern engineering, or graduate study in any engineering discipline.



Exhibits and Demonstrations in Talbot Laboratory

Department	Undergraduate Enrollment (Fall 1977)	Graduate Enrollment (Fall 1977)
Aeronautical and Astronautical Engineering	239	35
Agricultural Engineering	112	
Ceramic Engineering	124	25
Chemical Engineering	475	60
Civil Engineering	786	291
Computer Science	367	213
Electrical Engineering	1345	290
General Engineering	496	
Mechanical and Industrial Engineering	640	129
Metallurgy and Mining Engineering	84	66
Nuclear Engineering	108	95
Physics	108	270
Theoretical and Applied Mechanics	19	64

For more information, contact:

Associate Dean's Office
207 Engineering Hall
University of Illinois at Urbana-Champaign
Urbana, IL 61801

UIUC Student Chapters of Professional Societies

While in the process of becoming the type of engineer you want to become, don't overlook opportunities to broaden your exposure! You may discover a new area of interest that is in harmony with your goals. The UIUC student branches of professional engineering societies are open to participation by all interested engineering students--you don't have to be a particular major to get in on the action.

ENGINEERING SOCIETIES

American Academy of Mechanics (AAM)
American Ceramic Society (ACS)
American Foundrymen's Society (AFS)
American Institute of Aeronautics & Astronautics (AIAA)
American Institute of Chemical Engineers (AIChE)
American Institute of Industrial Engineers (AIIE)
American Nuclear Society (ANS)
American Society of Agricultural Engineers (ASAE)
American Society of Civil Engineers (ASCE)
American Society of Mechanical Engineers (ASME)
Association for Computing Machinery (ACM)
Association of Minority Students in Engineering (AMSIE)
Associated General Contractors (AGC)
Illinois Society of General Engineers (ISGE)
Institute of Electrical and Electronics Engineers (IEEE)
Institute of Transportation Engineers (ITE)
Physics Society (PS)
Society of Automotive Engineers (SAE)
Society of Co-operative Engineers (SCE)
Society of Women Engineers (SWE)
University of Illinois Metallurgical Society (UIMS)

ENGINEERING HONOR SOCIETIES

Name	Curriculum
Alpha Epsilon	Agricultural Engineering
Alpha Pi Mu	Industrial Engineering
Alpha Sigma Mu	Metallurgical Engineering
Chi Epsilon	Civil Engineering
Eta Kappa Nu	Electrical Engineering
Gamma Epsilon	General Engineering
Keramos	Ceramic Engineering
Phi Lambda Upsilon	Chemical Engineering
Pi Tau Sigma	Mechanical Engineering
Sigma Gamma Tau	Aeronautical Engineering
Tau Beta Pi	All Engineering

SITE — Student Introduction to Engineering

Sponsored by the College of Engineering to acquaint high school juniors and seniors with engineering as a profession

Campus Tours--9:00-12:00 a.m., Friday, March 3, 1978
Banquet--6:00 p.m., Thursday, March 2, 1978
Engineering Department Tours--Thursday, March 2, 2:00-5:00 p.m.

St. Pat's Ball — Saturday, March 4, 1978

Ramada Inn

Cocktail Hour with Hors d'Oeuvres	7:30-8:30
Engineering Open House Awards Presented	8:30
Dance	9:00-12:00

Music by Arme & Hammre